

## Recommendations for the Cushman Slide Project

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The Charles W. Cushman slide digitization project has raised a number of preservation issues. Most pressing are the concerns about present and future image degradation. As this project is expected to benefit other institutions, it is important that the university set an informed example in response to these problems.

The bulk of the Cushman slides are original Kodachromes, though there are some examples of Ansco slide film (Ansco Printon during WWII, later GAF) and an unidentified positive black and white film. The Kodachromes span the years 1938 – 1969. The original composition of Kodachrome film, produced 1935-1938, and designed to be processed by a complicated and lengthy controlled-diffusion bleach bath method, had a very poor dark storage stability. Slides from this early period exhibit nearly total loss of yellow dye, causing them to appear an almost uniform pink or magenta in color. Visual information in the highlights and shadows is drastically reduced. Later Kodachromes, designed for processing by a selective re-exposure reversal method, comprise the bulk of the collection and exhibit only slight fading.

Fortunately for the collection, Kodachrome, although it deteriorates rapidly with projector use, has the best dark storage stability of any slide film. For Kodachrome film in dark storage at 40% RH (Relative Humidity), the number of years for “just noticeable” fading to occur – that is, for the least stable image dye to fade 10% - is as follows: 65 years at 80°, 95 years at 75°, 900 years at 45°, 1,300 years at 40°, 1,900 years at 35°, and 32,000 years at 0° (Wilhelm). For higher RH levels, these numbers are greatly reduced. According to the Image Permanence Institute’s Preservation Calculator, increasing the RH from 40% to 70% (the average RH in Indianapolis for 1998-1999 was 72%) cuts this time roughly in half. RH, though less significant for color photographic material than temperature, is still a key factor in speeding or slowing the rate of fungus growth, film base deterioration, and the chemical reactions in the organic dyes, which cause them to stop absorbing light, and thus fade. Kodachrome, and especially Ansco, degrades more quickly at higher humidity levels. Thus, we have been lucky to catch this collection in relatively good condition, and have the opportunity to preserve that condition.

Because it is the only currently available means for preserving color materials, the need to store the collection at more desirable temperature and humidity levels is pressing. Ideal storage conditions for film should be no higher than 40°F and 40% RH (IPI recommends an RH of 20-30% for film storage). A common and practical solution is the use of a commercially available frost-free refrigerator, monitored for temperature (35-40°F) and humidity (20-35%), in which acid-free boxes housing the slides are bagged in polyethylene (Ziploc) and stored in the refrigerated portion. For long-term storage, the use of a frost-free freezer, at 0°F or below, in which items are sealed in polyethylene and Marvelseal, is preferable. Access is limited due to the need for warm-up times (generally

overnight) before retrieving items. Refrigeration of color photographic materials has been used at many familiar institutions such as the Museum of Modern Art in New York, and the Mathers Museum here in Bloomington. The Kinsey Institute of Bloomington, IN uses a frost-free freezer for its collection of George Platt Lyons negatives. Franziska Frey of IPI (formerly of the Institute of Physical Chemistry, Zurich) has emphasized the importance of getting our collection into cold storage to prevent further damage. If we wish to preserve the collection, we must act now.

Although refrigeration or freezing will ensure that the slides deteriorate more slowly, investigation of slide restoration techniques has revealed that no chemical treatment can restore original color to the drastically faded early Kodachromes. Dr. Frey has recommended that we send as many of these slides, affectionately called “color patients,” as possible to a Swiss lab which has provided services to various collections and institutions including the Whitney Museum. The reconstruction of color photographs using electronic imaging has been researched in Switzerland for over a decade. It is now possible to recover some of the original color to a digital image using a reconstruction algorithm based on the bleaching behavior of the photographic material. Dr. Frey thinks that “it is important for people to see what is happening to color photography whether we like it or not,” and therefore testing this restoration method ourselves might provide other institutions with solutions for, and awareness of, their aging color collections.

Most image digitization projects have involved black and white material, as these older materials have appreciated in historic value. Only about 5% of the extensive Library of Congress American Memory Project involves color photographic material. The Cushman collection represents a turning point in photography. When Kodachrome was introduced, “The new process was an overnight success, and it helped make the photographic amateur color-conscious to such a degree that great pressure soon began to be felt in the entire industry to make color available to all, in a cheap and simple manner” (Friedman, 108). Beginning in the mid-1960’s, amateur photography moved from color slides and black and white film to color film and prints. By 1990, 90% of the amateur market was using color negative film. However, “Virtually all color processes are inherently unstable because the final image material consists of organic dyes rather than silver or pigment particles suspended in gelatin,” (IFLA 1992). The color storage and restoration challenges posed by the Cushman collection are a taste of things to come for libraries, archives, museums, and individuals worldwide.

## Sources

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